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The lack of communication between the educational television lecturer and the students was considered. A feedback system was developed to enable a student to indicate his response to a TV lecturer's question by pushing one of five buttons at student stations in the TV lecture area. Via a read-out device the instructor evaluated the student responses and answers; then he elaborated his discussion or he continued lecturing. Chart recorders kept a permanent record for later analysis.

An experimental group of 102 students, selected at random, attended TV lectures in the humanities. The experimental group and control group A were given TV lectures with feedback. A third group, control group B, was given the same TV lecture at a different time with no feedback. After nine lectures, a test on lecture feedback material and on outside reading material was administered to each group.

The experimental group and the control group A did significantly better on tests. Learning was enhanced to a significant degree under the experimental feedback conditions tested.

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THE EFFECT OF IMMEDIATE FEEDBACK ON LEARNING IN HUMANITIES

JOHN C. WOODWARD

JUNE, 1964

Report 7

SUPPORTED BY A GRANT FROM THE FUND FOR THE ADVANCEMENT OF EDUCATION

THE EFFECT OF IMMEDIATE FEEDBACK ON LEARNING IN HUMANITIES

June 1964

Report No. 7

The feedback equipment and funds for this experiment were furnished under a grant from the General Electric Foundation, Mr. Roy J. Johnston, Director of Communications Services, University of Miami, Principal Investigator. The experiment was designed and conducted by Dr. John C. Woodward, Director of Evaluation, Office for the Study of Instruction, University College, University of Miami, Coral Gables, Florida.

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The Effect of Immediate Feedback on Learning in Humanities

Introduction and Statement of the Problem

In the normal classroom teaching situations the instructor has several ways of ascertaining, to a degree at least, the amount of learning taking place at any given time. The instructor may question the students, the students may question the instructor, the instructor may be able to tell by the general tenor of the class, the puzzled looks, the restlessness, the nods of understanding, etc., how the instruction is going at that point.

This is not true of television teaching. One of the major complaints of both television lecturers and their students is the lack of opportunity for interaction between them. Instructors have long felt a need for some kind of student feedback on the lecture. Students feel a need to let the lecturer know whether he is or is not being understood.

Obviously if a TV lecturer continues on the assumption that the concepts being presented are being understood by the majority of the students he is working under a false assumption. Yet under the system of one way communication this is the only alternative.

The basic problems of this research were:

1) The effect on student learning of immediate feedback to instructors of information concerning the amount of learning taking place during a TV lecture.

2) The effect on learning of immediate feedback to students of the results of responses made to learning situations during a TV lecture.

For the purpose of this study the following operational definitions were used:

1) Learning - Responses to multiple choice questions raised by the instructor during the TV lecture in Humanities 102.

2) Instructor feedback - General Electric electrical feedback system which enables the student to indicate his response to a question by pushing one of five pushbuttons installed at each student station in the TV lecture hall. This information is fed back to the instructor via a read-out device which contains five meters corresponding to the five pushbuttons at the response stations, thus enabling him to see the

percentage of students selecting each response. Continuous chart recorders corresponding to the buttons keep a permanent record of the class responses for later analysis.

3) Instructor - TV lecturer.

4) Humanities 102 - Composition and Humanities.

5) Experimental group - 100 students, selected at random, who will feedback information to instructors.

6) Control group A - All students in other sections who will see the same telecasts as the experimental group but will not be able to feedback information to the instructor. (vicarious feedback group)

7) Control group B - Students in lecture sections where feedback is not used in lectures.

The following hypotheses were used to guide the research:

Research hypotheses

1) Material presented in a feedback testing system during a TV lecture will be learned significantly better than concepts not presented in this way by both experimental and control group A in Humanities 102.

2) Material presented in a feedback system during a TV lecture will be learned significantly better by the experimental group than by either control groups A or B.

3) There is no significant difference between the learning of control group A and control group B on material presented in the feedback system.

Method of Procedure

The second semester of 1963-64 100 Humanities 102 students were selected at random. These students were assigned to University College, Room 180, which contains the General Electric feedback system. This group was designated as the experimental group. All other Humanities 102 students were designated as the control groups A and B.

The experimental group and control group A received TV lectures where feedback was used, control group B received essentially the same lecture at a different time with no feedback.

For nine lectures the Humanities 102 TV lecturer designed multiple choice questions over material to be covered in the lecture. These questions, along with the response choices, were prepared for visual presentation on TV at appropriate times during the TV lecture. When the question was presented on TV the students in the experimental group were required to indicate their response via the electronic feed-back system. Control group A students made no recorded response. As soon as the responses were recorded the correct response appeared on the TV screen. The instructor evaluated the results of the responses to the question, identified the correct response to the students, and either elaborated the material or went on with the lecture depending on the level of the response of the students. The TV lecturer gave the nine lectures to control group B but did not use a feedback system.

At the end of the experimental period, the nine lectures, a 100 item test was administered to both the experimental and control groups. This test was made up of 40 items from assigned reading material for the unit and 60 items constructed to measure the same material as the items presented via TV feedback.

Analysis of Data and Results

Table I is a summary of test results of the findings for total test score by group.

TABLE I

Total Test Means and Standard Deviations by Group

Group	Mean	Std.Dev.
Experimental	49.753	9.083
Control A	50.468	9.772
Control B	45.723	10.087

Analysis of t, sample groups unequal size, was used to test the significance of the difference among the means presented in Table I.

The results are as follows:

1) The t value of .545 in the comparison of the experimental group and control group A is smaller than that demanded for significance at the 5 percent level. Thus the null hypothesis of no significant difference between the groups cannot be rejected for total test score.

2) The analysis of the significance of the difference between the experimental group and control group B resulted in a t of 3.576 which is significant beyond the .001 level.

3) In the analysis of the difference in means for control groups A and B a t of 4.953 was obtained. This indicates a difference that would not be expected by chance more than 1 in 1,000 times.

The scores for the groups were analyzed for the 60 items covering the feedback material and the 40 items covering assigned reading material for the unit. These findings are presented in Table II.

TABLE II

Means and Standard Deviations, Feedback, and Assigned Reading by Group

Group	Feedback Material		Assigned Reading	
	Mean	Std.Dev.	Mean	Std.Dev.
Experimental	29.85	5.45	19.90	3.63
Control A	30.28	5.86	20.19	3.91
Control B	27.43	6.05	18.29	6.03

Analysis using t reveals the following concerning the information contained in Table II:

1) The difference in means noted between the experimental group and the control group A (vicarious feedback group) for feedback material and reading material is not significant. t ratios .4891 and .526 respectively.

2) The mean differences for feedback material and reading material between the experimental group and control group B are both significant at the .001 level. The t ratio for the lecture material feedback mean difference is 3.585, for the reading 3.573.

3) Control group A scored significantly higher than control group B in both areas. The t ratios of 4.488 and 4.973 for feedback material and reading material in that order are significant at the .001 level of confidence.

Summary and Conclusions

An experiment was conducted to determine whether or not learning during a TV lecture could be increased by using a student feedback system. Students in the experimental group responded to questions presented by the TV lecturer by pushing one of five buttons located at the student station in the classroom. These questions were over material covered in the lecture. A read-out meter in the TV studio enabled the instructor to know immediately how the students responded to each of the responses for the multiple choice question. The TV instructor evaluated the results of the responses to the question, identified the correct response to the students, and either elaborated the material or went on with the lecture, depending on the level of the students' responses.

Control group A seated in another classroom received the same lecture at the same time as the control group. They did not have the feedback equipment.

A third group, control group B, was given the same TV lecture at a different time with no feedback used.

The experimental group and the control group A did significantly better on tests of both lecture feedback material and reading material than did control group B . There were no differences in these areas between the experimental and control group A.

It may be concluded from this experiment that learning is enhanced to a significant degree under the experimental feedback conditions tested.

Discussion

The results of this experiment raise several important and interesting questions. Since the control group A did as well as the experimental group, was the superiority of these two groups over the non-feedback group due to factors other than feedback? These groups did better not only in the lecture area, but in the assigned reading area also. Were these gains due to the Hawthorne effect (no matter what you do you get positive results) or to some other non-controled factors?

It should be remembered that even though control group A did not have the feedback equipment they benefited from feedback. The instructor responded to information received from the experimental group and in many cases altered emphasis on course material because of student feedback.

A pedogodical method may have been the true experimental variable. The fact that the instructor used the questioning approach may have been the determining factor in the experiment. This could be tested in another experiment designed to give control group B the questions and answers during the lecture without feedback response by either the students or instructor.

Answers to the questions raised here and others must await further experimentation in this area.